



Early Journal Content on JSTOR, Free to Anyone in the World

This article is one of nearly 500,000 scholarly works digitized and made freely available to everyone in the world by JSTOR.

Known as the Early Journal Content, this set of works include research articles, news, letters, and other writings published in more than 200 of the oldest leading academic journals. The works date from the mid-seventeenth to the early twentieth centuries.

We encourage people to read and share the Early Journal Content openly and to tell others that this resource exists. People may post this content online or redistribute in any way for non-commercial purposes.

Read more about Early Journal Content at <http://about.jstor.org/participate-jstor/individuals/early-journal-content>.

JSTOR is a digital library of academic journals, books, and primary source objects. JSTOR helps people discover, use, and build upon a wide range of content through a powerful research and teaching platform, and preserves this content for future generations. JSTOR is part of ITHAKA, a not-for-profit organization that also includes Ithaka S+R and Portico. For more information about JSTOR, please contact support@jstor.org.

IMPORTANT NOTICE TO PRESENT MONTHLY SUBSCRIBERS.

Henceforth, the subscription price of the MONTHLY will be *three dollars net to all non-members of the ASSOCIATION*. The following adjustments for prospective members are proposed:

(1) Those who have already paid their subscriptions for the entire year 1916 are asked to send *one dollar* additional, which will entitle them to membership in the ASSOCIATION.

(2) Those who have not paid for 1916 are asked to send *three dollars*, which will entitle them to membership and include the MONTHLY. *No further subscriptions for 1916 will be received at the old rate of two dollars.*

In the case of subscriptions under (1) or (2) which expire *before* the end of 1916, please add *twenty cents extra* for each copy needed to complete the year. *Hereafter all subscriptions will date from January of each year.*

(3) An institution in which the Calculus is taught may become an *institutional member* of the ASSOCIATION by the payment of *five dollars* annually, which will entitle the library to receive *two copies of the MONTHLY* and the institution to send a voting delegate to all meetings of the ASSOCIATION. Institutions in which the Calculus is taught, whose libraries have already renewed their subscriptions for 1916, are asked to send *three dollars additional* and thus become institutional members of the ASSOCIATION.

Other institutions, and those not wishing to become institutional members, whose library subscriptions have already been renewed for 1916, are asked to send *one dollar additional* to complete the advanced price of the MONTHLY. No further subscriptions will be received at the old rate of two dollars, *and no discount from the advanced rate of three dollars will be allowed on subscriptions made through agencies.*

(4) The obligations of the MONTHLY for 1916 will, of course, be fulfilled on the former basis in the case of any individual or institution whose subscription has already been paid, and who may decline to make the adjustment on the new basis.

(5) Please note that all subscriptions to the MONTHLY and dues in the ASSOCIATION are to be paid to the SECRETARY-TREASURER, Professor W. D. CAIRNS, 55 East Lorain St., Oberlin, Ohio.

In order to make sure of receiving the February MONTHLY, please sign and return the membership blanks IMMEDIATELY. Otherwise the publishers cannot determine how large an edition to print.

IMPORTANT ANNOUNCEMENT TO ALL INTERESTED IN MATHEMATICAL PROGRESS

THE AMERICAN MATHEMATICAL MONTHLY, since its reorganization in January, 1913, has endeavored to fulfill its mission as "A JOURNAL FOR TEACHERS OF MATHEMATICS IN THE COLLEGIATE AND ADVANCED SECONDARY FIELDS."

A selection from the Tables of Contents thus far includes articles on—
The History of Mathematics, such as the following:

- "History of the Exponential and Logarithmic Concepts," by PROFESSOR FLORIAN CAJORI of Colorado College;
- "The Foundation Period in the History of Group Theory," by JOSEPHINE BURNS, Graduate Student at the University of Illinois;
- "Errors in the Literature on Groups of Finite Order," by PROFESSOR G. A. MILLER, University of Illinois;
- "Number Systems of the North American Indians," by PROFESSOR W. C. EELLS, United States Naval Academy;
- "The Algebra of Abu Kamil," by PROFESSOR L. C. KARPINSKI, University of Michigan;
- "Centers of Similitude of Circles and Certain Theorems Attributed to Monge. Were they known to the Greeks?" by PROFESSOR R. C. ARCHIBALD, Brown University;
- "The History of Zeno's Arguments: Phases in the Development of the Theory of Limits," by PROFESSOR FLORIAN CAJORI, Colorado College.

Pedagogical Considerations, such as the following:

- The "Foreword" concerning Collegiate Mathematics, by PROFESSOR E. R. HEDRICK, University of Missouri;
- "Some Things we wish to know," by PROFESSOR E. R. HEDRICK;
- "Mathematical Literature for High Schools," by PROFESSOR G. A. MILLER;
- "Mathematical Troubles of the Freshman," by PROFESSOR G. A. MILLER;
- "Minimum Courses in Engineering Mathematics," by PROFESSOR SAUL EPSTEIN, University of Colorado;

- "Incentives to Mathematical Activity," by PROFESSOR H. E. SLAUGHT, University of Chicago;
- "Synthetic Projective Geometry as an Undergraduate Study," by PROFESSOR W. H. BUSSEY, University of Minnesota;
- "Retrospect and Prospect," by PROFESSOR H. E. SLAUGHT;
- "Note on a Memory Device for Hyperbolic Functions," by F. S. ELDER, Central High School, Kansas City, Mo.;
- "A Plea for less Formal Work in Mathematics," by F. M. MORGAN, Dartmouth College;
- "A Simple Algebraic Paradox," by PROFESSOR J. L. COOLIDGE, Harvard University;
- "Note on Simple Algebraic Equations," by PROFESSOR H. L. SLOBIN, University of Minnesota;
- "On Courses in Synthetic Projective Geometry," by PROFESSORS LAO G. SIMONS, Normal College of the City of New York, C. E. STROMQUIST, University of Wyoming, T. G. RODGERS, Normal School of New Mexico, R. D. CARMICHAEL, and D. N. LEHMER;
- "On the Cultural Value of Mathematics," by PROFESSORS W. T. STRATTON, Kansas State Agricultural College, and D. N. LEHMER;
- "On Courses in the History of Mathematics," by PROFESSORS W. T. STRATTON and G. A. MILLER;
- "Remarks on Klein's Famous Problems of Elementary Geometry," by PROFESSOR R. C. ARCHIBALD, Brown University;
- "On the Trisection of an Angle and the Construction of Regular Polygons of 7 and 9 Sides," by PROFESSOR L. E. DICKSON, University of Chicago;
- "An Equation Balance for Class-Room Use," by PROFESSOR E. W. PONZER, Stanford University;
- "A Cardioidograph," by C. M. HEBBERT, University of Illinois;
- "Coördinated Courses in High School Mathematics," by EDITH LONG, Lincoln, Neb., and ROY CUMINS, Columbia University;
- "Conference Periods for Students," by PROFESSOR C. R. McINNES, Princeton University, and PROFESSOR C. S. ATCHISON, Washington and Jefferson College;
- "Determinant Formula for Coplanarity of Four Points," by PROFESSOR A. M. KENTON, Purdue University;
- "What can the Colleges do toward Improving the Teaching of Mathematics in the Secondary Schools?" by PROFESSOR C. N. MOORE, University of Cincinnati.

General Mathematical Information, such as the following:

- "The Third Cleveland Meeting of the American Association for the Advancement of Science," by PROFESSOR G. A. MILLER;
- "Western Meetings of Mathematicians," by PROFESSOR H. E. SLAUGHT;
- "Summer Meeting of the American Mathematical Society," by PROFESSOR H. E. SLAUGHT;
- "Notes and News" of events pertaining to mathematics, under the direction of a committee of which PROFESSOR FLORIAN CAJORI is chairman;
- "The Napier Tercentenary Celebration," by PROFESSOR FLORIAN CAJORI, Colorado College;
- "The Paris Report on Calculus in the Secondary Schools," EDITORIAL;
- "California Teachers of Mathematics," EDITORIAL;
- "Book Reviews" and announcements of new books in Mathematics, under the direction of a committee of which PROFESSOR W. H. BUSSEY, University of Minnesota, is chairman.
- Fifty-four books have thus far been reviewed, each by a selected expert in his field.

Topics Involving a Minimum of Technical Treatment, such as the following:

- "Maximum Parcels under the New Parcel Post Law," by PROFESSOR W. H. BUSSEY;
- "Precise Measurements with a Steel Tape," by PROFESSOR G. R. DEAN, Missouri School of Mines;
- "A Direct Definition of Logarithmic Derivative," by PROFESSOR E. R. HEDRICK;
- "A Simple Formula for the Angle Between Two Planes," by PROFESSOR E. V. HUNTINGTON, Harvard University;
- "On the Solutions of Linear Equations having Small Determinants," by PROFESSOR F. R. MOULTON, University of Chicago;
- "The Accuracy of Interpolation in a Five-Place Table of Logarithms of Sines," by PROFESSORS A. M. KENYON and G. JAMES, Purdue University;
- "A Theorem about Isogonal Conjugates," by DAVID F. BARROW, Harvard University;
- "The Significance of the Weierstrass Theorem," by PROFESSOR E. R. HEDRICK;
- "On the Impossibility of Certain Diophantine Equations and Systems of Equations," by PROFESSOR R. D. CARMICHAEL, Indiana University;
- "A Computation Formula in Probability," by E. C. MOLINA, New York City;
- "Two Geometrical Applications of the Method of Least Squares," by PROFESSOR J. L. COOLIDGE, Harvard University;
- "A Puzzle Generalized," by PROFESSOR R. P. BAKER, University of Iowa;
- "On Certain Diophantine Equations having Multiple Parameter Solutions," PROFESSOR R. D. CARMICHAEL;
- "A Geometrical Discussion of the Regular Inscribed Hexagon," by J. Q. McNATT, Florence Colo., and S. A. JOFFE, New York City;
- "A Theorem in Number Theory connected with the Binomial Formula," by Professor D. N. LEHMER;
- "An Application of Partial Derivatives to the Ellipse," by PROFESSOR M. O. TRIPP, Muncie, Ind.;
- "A Curious Convergent Series," by PROFESSOR A. J. KEMPNER, University of Illinois;
- "Optical Interpretations in Higher Geodesy," by PROFESSOR W. H. ROEVER, Washington University;
- "A Problem in Number Theory," by PROFESSOR G. A. OSBORNE, Massachusetts Institute of Technology;
- "Perfect Magic Squares for 1914," by V. M. SPUNAR, Chicago, Ill., and PROFESSOR B. L. REMICK, Manhattan, Kan.;
- "The Construction of Conics under given Conditions," by Dr. B. M. WOODS, University of California;
- "A Simple Method of Constructing the Normals to a Parabola," by PROFESSOR S. G. BARTON, University of Pennsylvania;
- "Some Properties of the Normals to a Parabola," by PROFESSOR S. G. BARTON;
- "Apparent Size of a Cube," by PROFESSOR A. M. HARDING, University of Arkansas;
- "Residues of Certain Sums of Powers of Integers," by PROFESSOR T. M. PUTNAM, University of California;
- "Groups of Figures in Elementary Geometry," by PROFESSOR G. A. MILLER, University of Illinois;

- "On the Use of Partial Derivatives in Plotting Equations from their Curves," by PROFESSOR A. M. KENYON, Purdue University;
- "A Method of Solving Numerical Equations," by S. A. COREY, Hiteman, Iowa;
- "Sur un Paradoxe Algébrique Apparent," par G. LORIA, Université de Gène;
- "The Theorem of Rotation in Elementary Mechanics," by PROFESSOR E. V. HUNTINGTON, Harvard University;
- "Groups of Subtraction and Division with Respect to a Modulus," by PROFESSOR G. A. MILLER, University of Illinois;
- "Questions and Discussions," under the direction of PROFESSOR U. G. MITCHELL, University of Kansas;
- "Problems Proposed and Solved," under the direction of PROFESSORS B. F. FINKEL, Drury College, and R. P. BAKER, University of Iowa.

Topics Involving Somewhat More Technical Treatment, designed to stimulate mathematical activity on the part of ambitious students and teachers. Such articles have occupied only about one-sixth of the entire space; for example, such as the following:

- "The Remainder Term in a Certain Development of $F(a+x)$," by PROFESSOR R. D. CARMICHAEL;
- "A Geometric Interpretation of the Function F in Hyperbolic Orbits," by PROFESSOR W. O. BEAL, Illinois College;
- "Certain Theorems in the Theory of Quadratic Residues," by PROFESSOR D. N. LEHMER, University of California;
- "Some Inverse Problems in the Calculus of Variations," by DR. E. J. MILES, Yale University;
- "Amicable Number Triples," by PROFESSOR L. E. DICKSON, University of Chicago;
- "The Probability Integral," by PROFESSOR E. L. DODD, University of Texas;
- "A Note on the Solution of Linear Differential Equations," by DR. C. R. MACINNES, Princeton University;
- "A Graphical Solution of the Differential Equation of the First Order," by PROFESSOR T. R. RUNNING, University of Michigan;
- "The Curve of Light on a Corrugated Dome," by PROFESSOR W. H. ROEVER, Washington University;
- "The Cube Root of a Binomial Surd," by PRINCIPAL ARTHUR C. JOHNSON, Hopedale, Mass.
- "The Tactical Problem of Steiner," by PROFESSOR W. H. BUSSEY;
- "On Some Geometric Properties of Circular Transformations," by PROFESSOR ARNOLD EMCH, University of Illinois;
- "A Note on Plane Kinematics," by PROFESSORS ALEXANDER ZIWET and PETER FIELD; University of Michigan;
- "A Theorem in the Modern Plane Geometry of the Abridged Notation," by PROFESSOR R. E. BRUCE, Boston University;
- "On a purely Projective Basis for the Theory of Involution," by PROFESSOR D. N. LEHMER;
- "A Formula for the Sum of a Certain Type of Infinite Power Series," by ELBERT H. CLARKE, Purdue University;
- "On a Special Case of the Tetrahedral Complex," by PROFESSOR D. N. LEHMER, University of California;
- "General Formula for the Valuation of Securities," by PROFESSOR J. W. GLOVER, University of Michigan.

IN PREPARATION

Fundamental Conceptions of Modern Mathematics

BY

ROBERT P. RICHARDSON

AND

EDWARD H. LANDIS

Cloth \$1.25 net

The subtitle of this book is "Variables and Quantities with a Discussion of the General Conception of Functional Relation." It is the first of a series projected to cover all the fundamental conceptions of modern mathematics.

The authors' treatment considers mathematics as a science rather than as an art. The three main topics are : Pure formalism as a science of symbols ; the realities underlying mathematical formulae which gives an account of quantities and their classification ; and the constitution of variables and the essential characteristics of the functional relation between variables.

The questions that come within the scope of this book are by far the most fundamental of all arising in mathematical science.

Open Court Publishing Company
CHICAGO AND LONDON

The American Mathematical Monthly

**Is the Only Journal of Collegiate Grade in
The Mathematical Field in this Country**

This means that its mathematical contributions can be read and understood by those who have not specialized in mathematics beyond the Calculus.

The Historical Papers, which are numerous and of high grade, are based upon original research.

The Questions and Discussions, which are timely and interesting, cover a wide variety of topics.

The Book Reviews embrace the entire field of collegiate and secondary mathematics.

The Curriculum Content in the collegiate field is carefully considered. Good papers in this line have appeared and are now in type awaiting their turn.

The Notes and News cover a wide range of interest and information both in this country and in foreign countries.

The Problems and Solutions hold the attention and activity of a large number of persons who are lovers of mathematics for its own sake.

There are other journals suited to the Secondary field, and there are still others of technical scientific character in the University field: but the MONTHLY is the only journal of Collegiate grade in America suited to the needs of the non-specialist in mathematics.

Send for circulars showing the articles published in the last two volumes.

Sample copies and all information may be obtained from the

MANAGING EDITOR, H. E. SLAUGHT

5548 Kenwood Ave.

Chicago, Ill.

LATEST MATHEMATICAL TEXTBOOKS

Bôcher and Gaylord's Trigonometry

By MAXIME BÔCHER, Professor in Harvard University, and H. D. GAYLORD, Master in Browne and Nichols School, Cambridge. ix+142 pp. 12mo. \$1.00.

- W. F. OSGOOD, *Harvard University*:—It meets the need of treating briefly, but adequately, a brief subject, thus enabling the instruction to proceed without undue delay, to the larger subjects of analytic geometry and the calculus.
- H. C. VAN BUSKIRK, *Throop College of Technology, Pasadena, Calif.*:—I have examined it quite carefully and think it is a very good text. It is clear and concise and the quite uniform consistency in the data of the problems is a pleasant relief from the usual 'hit and miss' plan, or lack of plan, of most trigonometries.

Dowling and Turneure's Analytic Geometry

By L. W. DOWLING, Associate Professor of Mathematics, and F. E. TURN-
EAURE, Dean of the College of Engineering in the University of Wisconsin.
(*American Mathematical Series.*) xii+266 pp. 12mo. \$1.60.

- E. E. DECOU, *University of Oregon*:—It is a comprehensive and well worked out text that should prove a valuable textbook.
- STEWART L. MACDONALD, *State Agricultural College, Fort Collins, Colo.*:—I rather like the idea of early introducing polar coordinates which the authors use. The general treatment seems to be clear and easily read.
- B. L. REMICK, *Kansas State Agricultural College*:—A first examination yields on the whole a rather favorable impression, especially with respect to the use of the graph and functional idea.

Snyder and Sisam's Analytic Geometry of Space

By VIRGIL SNYDER, Professor in Cornell University, and C. H. SISAM, Assistant Professor in University of Illinois. (*American Mathematical Series.*) xi+289 pp. 12mo. \$2.50.

- E. J. WILCZYNSKI, *University of Chicago*:—My first impressions are extremely favorable. It is, I think, the best book on the subject now in our possession and I shall use it the next time I have an opportunity to give a course on the subject.



HENRY HOLT AND COMPANY

34 West 33d Street
NEW YORK

623 So. Wabash Ave
CHICAGO, ILL.

STANDARD TEXTS

Anthony=Ashley Descriptive Geometry

Diagrams and descriptive text are so arranged that it is unnecessary to turn a page to refer to a diagram. The number of problems is exceptionally large. Cloth. 180 pages. \$2.00.

Barton's Plane Survey

The revised edition of this book contains the latest available data. The work is adapted to meet the most exacting requirements. A complete set of tables is included. 263 pages. \$1.60.

Burkhardt's Theory of Functions of a Complex Variable

This is the authorized translation from the fourth German edition with the addition of figures and about 400 exercises by Professor S. E. Rasor of the Ohio State University. 445 pages. \$4.00.

Cohen's Differential Equations

Presents the principles and devices needed to integrate most of the equations the ordinary student will meet. The book includes numerous applications, and problems in geometry and the physical sciences. 280 pages. \$2.00.

Cohen's The Lie Theory

This work offers a clear exposition of the Lie theory of one-parameter groups with applications to the solution of differential equations. 254 pages. \$2.00.

Fite's College Algebra

The clearness, brevity, and rigor of this book won for it widely extended use from the day of its publication. Its perfect adaptation to the needs of college classes is indicated by its steadily increasing sale. 289 pages. \$1.40.

Miller and Lilly's Analytic Mechanics

A course that is distinctly teachable, practical, rigorous, and adaptable. Abundant problems and exercises are included. 312 pages. \$2.00.

Correspondence invited

D. C. HEATH & COMPANY, Publishers

Boston

New York

Chicago

London

THE AMERICAN MATHEMATICAL MONTHLY

TERMS: Three dollars per year in advance. Fifty cents additional for delivery in Foreign Countries.

SUBSCRIPTIONS should be made payable to **THE MATHEMATICAL ASSOCIATION OF AMERICA**, and sent to the **TREASURER**, W. D. CAIRNS, 55 Lorain St., Oberlin, Ohio.

FOREIGN AGENTS: Z. P. Maruya & Co., Ltd., Tokyo, Japan.

A. Hermann, 8 Rue de la Sorbonne, Paris, France.

The need of a standard journal in this country, with aims such as those of the **AMERICAN MATHEMATICAL MONTHLY**, is attested by the fact that the subscription list has nearly trebled since the reorganization in 1912. All friends of the cause can assist in the good work by passing the word along to others and by sending to the Managing Editor the names of those who should be interested in such a journal.

The Constituency of the Monthly should include:

- 1) All teachers of the advanced courses in secondary schools, especially in those schools which offer trigonometry, college algebra, and analytic geometry.
- 2) All teachers of undergraduate courses in mathematics in colleges, universities, and engineering schools.
- 3) University professors of mathematics who wish to keep in touch with pedagogical movements in the collegiate field.
- 4) Graduate students in mathematics who wish to profit by historical and pedagogical discussions among teachers of experience
- 5) All productive workers in mathematics who may occasionally desire a place of publication for articles of minimum technical difficulty suitable for the promotion of scientific interest among the average mathematical readers.
- 6) All who are interested in the proposal and solution of problems, especially those who seek assistance from co-workers with respect to actual difficulties encountered in the prosecution of research.
- 7) All public libraries and the libraries of all colleges, normal schools, and the larger high schools.

For articles already published see the indexes of volumes XX to XXII.

Professor Cajori's historical articles tracing the Theory of Limits began in the January issue for 1915, and closed in the November issue.

Sample Copies may be obtained from the **MANAGING EDITOR**, H. E. SLAUGHT, 5548 Kenwood Ave., Chicago, Ill.

The American Mathematical Monthly

For the convenience of contributors the following scale of prices for reprints is given. An order for reprints should be made in returning galley proof sheets to the Managing Editor.

SCALE OF PRICES

	4 pp.	8 pp.	12 pp.	16 pp.	20 pp.	24 pp.	28 pp.	32 pp.	48 pp.	64 pp.
25 Copies	\$1.35	\$1.80	\$2.35	\$2.60	\$3.25	\$3.85	\$4.65	\$5.10	\$7.15	\$9.35
50 Copies	1.45	1.95	2.60	2.92	3.67	4.30	5.20	5.70	8.10	10.60
75 Copies	1.60	2.30	3.05	3.45	4.70	4.95	6.10	6.60	9.45	11.05
100 Copies	1.80	2.60	3.50	3.95	5.10	5.90	7.00	7.50	10.85	13.05
150 Copies	2.05	3.05	4.20	4.85	6.75	6.95	7.35	9.15	13.20	17.55
200 Copies	2.35	3.75	5.25	6.15	7.85	8.75	10.45	11.05	16.35	21.65
300 Copies	2.95	4.75	6.85	8.15	10.60	11.90	14.10	14.85	22.15	29.55

Covers extra, on regular stock: 50 copies \$1.00, and one cent for each additional copy.

The above represents actual cost of production. No reprints can be given free, but a few extra copies of the journal containing a contribution will be given to the author.

THE NEW ERA PRINTING COMPANY

LANCASTER, PA.

Is prepared to execute in first-class and satisfactory manner all kinds of printing and electrotyping. Particular attention given to the work of Schools, Colleges, Universities, and Public Institutions.

Books, Periodicals

Technical and Scientific Publications

Monographs, Theses, Catalogues

Announcements, Reports, etc.

All Kinds of Commercial Work

(Printers of the Bulletin and Transactions of the American Mathematical Society, etc., etc.)

Publishers will find our product ranking with the best in workmanship and material, at satisfactory prices. Our imprint may be found on a number of high-class Technical and Scientific Books and Periodicals. Correspondence solicited. Estimates furnished.

THE NEW ERA PRINTING COMPANY

Send for Catalogue and List of our Mathematical Publications

Among the latest are

Hart & Feldman's Plane and Solid Geometry	\$1.25
Snyder & Hutchinson's Elementary Textbook on the Calculus	2.20
Smith's Plane and Solid Geometry	1.25
Solid Geometry75
Stamper's The Teaching of Arithmetic	1.00
Collins's Advanced Algebra	1.00
Van Tuyl's Essentials of Business Arithmetic70
Somerville's Elementary Algebra (Revised)	1.00
Bookman's Business Arithmetic65
Raymond's Plane Surveying (Revised)	3.00
Robbins's New Plane Geometry80
Milne's First Year Algebra85
Milne's Second Course in Algebra88
Milne's Standard Algebra (Revised) <small>Covers a complete 1½ years High School Course</small>	1.00
Rivenburg's A Review of Algebra36

Your correspondence is solicited

NEW YORK
CINCINNATI
CHICAGO
BOSTON
ATLANTA

AMERICAN BOOK COMPANY

330 East 22d Street,

CHICAGO, ILL.